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EXAMINER

RENNER, CRAIG A

ART UNIT

PAPER NUMBER

2652

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,639

Applicant(s)

HSU ET AL.

Examiner

Craig A. Renner

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 7,8,17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,9-12,15 and 16 is/are rejected.
- 7) ☒ Claim(s) 5,13 and 14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>31 January 2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of "Species I," upon which "Applicants believe that claims 1-6 and 9-16 read," in the reply filed on 03 February 2006 is acknowledged. Accordingly, claims 7-8 and 17-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim.

Drawings

2. The drawings are objected to because of the following informalities:

a. The drawings fail to comply with 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "wherein the floating-trailing shield has an off-center thickness perpendicular to an air-bearing surface that is larger than a thickness at a center of the ... shield as viewed from the air-bearing surface," as set forth in claims 5 and 14, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

b. The drawings fail to comply with 37 CFR 1.84(p)(5) because they include one or more reference signs not mentioned in the description. Note, for instance, " Φ " (shown thrice in Fig. 7 and four times in Fig. 8, for instance) and " Φ_o " (shown in Figs. 7 and 8, for instance).

- c. In Fig. 4, "BY" should be changed to --By-- in order to be consistent with the remainder of the disclosure.
- d. In Fig. 7, the left-most reference sign "42" should be changed to --41-- in order to be consistent with the remainder of the disclosure.
- e. In Fig. 7, the reference sign "34" should be changed to --43-- in order to be consistent with the remainder of the disclosure.
- f. In Fig. 7, the right-most reference sign "42" should be changed to --44-- in order to be consistent with the remainder of the disclosure.
- g. In Fig. 8, the left-most reference sign "42" should be changed to --41-- in order to be consistent with the remainder of the disclosure.
- h. In Fig. 8, the reference sign "34" should be changed to --43-- in order to be consistent with the remainder of the disclosure.
- i. In Fig. 8, the right-most reference sign "42" should be changed to --44-- in order to be consistent with the remainder of the disclosure.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) and/or an amendment to the specification in compliance with 37 CFR 1.121(b) and/or an amendment to the claims in compliance with 37 CFR 1.121(c) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are

not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because it is not "within the range of 50 to 150 words." Appropriate correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities:

a. In line 3 on page 7, "main pole piece 41" should be changed to --main pole piece 43-- in order to be consistent with the remainder of the disclosure.

b. In line 1 on page 15, "P rp ndicular" should be corrected to read --Perpendicular--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 2 and 3 of claim 2, each instance of "the air-bearing surface" is indefinite because it lacks clear and/or positive antecedent basis.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-3 and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Mallary (US 6,842,313).

With respect to claims 1-3, Mallary teaches a thin film magnetic recording head (100) comprising a yoke (includes 114 and 126/128) including a main pole piece (126/128) of ferromagnetic material and a return pole piece (114) of ferromagnetic material; and a floating-trailing shield (136) of ferromagnetic material positioned on an opposite side of the main pole piece from the return pole piece (as shown in FIG. 4, for

Art Unit: 2652

instance), the floating-trailing shield being separated from the yoke by non-magnetic material (132) [as per claim 1]; wherein the floating-trailing shield has a first area on the air-bearing surface that is larger than a second area of the main pole piece on the air-bearing surface (as shown in FIG. 4, for instance) and the first area is capable of generating a first magnetic reluctance between the main pole piece and the shield that is substantially greater than a second magnetic reluctance between the shield and a magnetically soft underlayer in a magnetic recording medium (i.e., dependent on the selection of the magnetic recording medium, which is not yet positively set forth in combination with the head in the claims) [as per claim 2]; wherein the main pole piece has a first area on an air-bearing surface of the head and the floating-trailing shield has a second area on the air-bearing surface and the second area is substantially greater than the first area (as shown in FIG. 4, for instance) [as per claim 3]. With respect to the intended use limitation appearing in line 1 of claim 1, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic recording medium", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations, *Ex parte Masham*, 2 USPQ2d 1647 (PTO BPAI 1987).

With respect to claims 15-16, Mallary teaches a thin film magnetic recording head (100) comprising a yoke (includes 114 and 126/128) including a main pole piece (126/128) of ferromagnetic material that extends to an air-bearing surface of the head (as shown in FIG. 4, for instance) and a return pole piece (114) of ferromagnetic

Art Unit: 2652

material that extends to the air-bearing surface of the head (as shown in FIG. 4, for instance); a floating-trailing shield (136) of ferromagnetic material separated from the yoke by non-magnetic material (132), extending to the air-bearing surface of the head (as shown in FIG. 4, for instance) and positioned on an opposite side of the main pole piece from the return pole piece at the air-bearing surface (as shown in FIG. 4, for instance) [as per claim 15]; wherein a first magnetic reluctance between the main pole piece and the floating-trailing shield is capable of being substantially greater than a second magnetic reluctance between the floating-trailing shield and a magnetically soft underlayer of a magnetic medium (i.e., dependent on the selection of the magnetic medium, which is not yet positively set forth in combination with the head in the claims). With respect to the intended use limitation appearing in lines 1-2 of claim 15, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic medium with a magnetically soft underlayer", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra.

9. Claims 1-4 and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura et al. (US 6,894,856).

With respect to claims 1-4, Nakamura teaches a thin film magnetic recording head (FIG. 19, for instance) comprising a yoke (includes 131 and 192) including a main pole piece (131) of ferromagnetic material and a return pole piece (192) of

Art Unit: 2652

ferromagnetic material; and a floating-trailing shield (197) of ferromagnetic material positioned on an opposite side of the main pole piece from the return pole piece (as shown in FIG. 19, for instance), the floating-trailing shield being separated from the yoke by non-magnetic material (as shown in FIG. 19, for instance) [as per claim 1]; wherein the floating-trailing shield has a first area on the air-bearing surface that is larger than a second area of the main pole piece on the air-bearing surface (as shown in FIG. 19, for instance) and the first area is capable of generating a first magnetic reluctance between the main pole piece and the shield that is substantially greater than a second magnetic reluctance between the shield and a magnetically soft underlayer in a magnetic recording medium (i.e., dependent on the selection of the magnetic recording medium, which is not yet positively set forth in combination with the head in the claims) [as per claim 2]; wherein the main pole piece has a first area on an air-bearing surface of the head and the floating-trailing shield has a second area on the air-bearing surface and the second area is substantially greater than the first area (as shown in FIG. 19, for instance) [as per claim 3]; and wherein the main pole piece has a tip that extends from an air-bearing surface of the head to a flare point on the main pole piece (as shown in FIG. 19, for instance); and the floating-trailing shield has a thickness measured perpendicular to the air-bearing surface that is less than a length of the tip from the air-bearing surface to the flare point (as shown in FIG. 19, for instance) [as per claim 4]. With respect to the intended use limitation appearing in line 1 of claim 1, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic

Art Unit: 2652

recording medium", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra.

With respect to claims 15-16, Nakamura teaches a thin film magnetic recording head (FIG. 19, for instance) comprising a yoke (includes 131 and 192) including a main pole piece (131) of ferromagnetic material that extends to an air-bearing surface of the head (as shown in FIG. 19, for instance) and a return pole piece (192) of ferromagnetic material that extends to the air-bearing surface of the head (as shown in FIG. 19, for instance); a floating-trailing shield (197) of ferromagnetic material separated from the yoke by non-magnetic material (as shown in FIG. 19, for instance), extending to the air-bearing surface of the head (as shown in FIG. 19, for instance) and positioned on an opposite side of the main pole piece from the return pole piece at the air-bearing surface (as shown in FIG. 19, for instance) [as per claim 15]; wherein a first magnetic reluctance between the main pole piece and the floating-trailing shield is capable of being substantially greater than a second magnetic reluctance between the floating-trailing shield and a magnetically soft underlayer of a magnetic medium (i.e., dependent on the selection of the magnetic medium, which is not yet positively set forth in combination with the head in the claims). With respect to the intended use limitation appearing in lines 1-2 of claim 15, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic medium with a magnetically soft underlayer", for

instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra.

10. Claims 1-3, 6, 9-12 and 15-16 are rejected under 35 U.S.C. 102(a) and/or 35 U.S.C. 102(e) as being anticipated by Shukh et al. (US 2003/0117749).

With respect to claims 1-3 and 6, Shukh teaches a thin film magnetic recording head (200) comprising a yoke (202) including a main pole piece (204) of ferromagnetic material and a return pole piece (206) of ferromagnetic material; and a floating-trailing shield (234) of ferromagnetic material positioned on an opposite side of the main pole piece from the return pole piece, the floating-trailing shield being separated from the yoke by non-magnetic material (236) [as per claim 1]; wherein the floating-trailing shield has a first area on the air-bearing surface that is larger than a second area of the main pole piece on the air-bearing surface (as shown in FIG. 6, for instance) and the first area is capable of generating a first magnetic reluctance between the main pole piece and the shield that is substantially greater than a second magnetic reluctance between the shield and a magnetically soft underlayer in a magnetic recording medium (i.e., dependent on the selection of the magnetic recording medium, which is not yet positively set forth in combination with the head in the claims) [as per claim 2]; wherein the main pole piece has a first area on an air-bearing surface of the head and the floating-trailing shield has a second area on the air-bearing surface and the second area is substantially greater than the first area (as shown in FIG. 6, for instance) [as per claim 3]; and wherein the thin film magnetic recording head further comprises a layer of

Art Unit: 2652

electrically conductive metal (240) separating the floating-trailing shield from the main pole piece (as shown in FIG. 6, for instance) [as per claim 6]. With respect to the intended use limitation appearing in line 1 of claim 1, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic recording medium", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra.

With respect to claims 9-12, Shukh teaches a thin film magnetic recording head (200) comprising a main pole piece (204) of ferromagnetic material; a return pole piece (206) of ferromagnetic material; a layer of electrically conductive metal (240) adjacent to the main pole piece on an opposite side of the main pole piece from the return pole piece (as shown in FIG. 6, for instance); and a floating-trailing shield (234) of ferromagnetic material positioned adjacent to the layer of electrically conductive metal (as shown in FIG. 6, for instance) so that the layer of electrically conductive metal separates the floating-trailing shield from the main pole piece (as shown in FIG. 6, for instance) [as per claim 9]; wherein a first magnetic reluctance between the main pole piece and the shield that is capable of being substantially greater than a second magnetic reluctance between the floating-trailing shield and a magnetically soft underlayer of a magnetic medium (i.e., dependent on the selection of the magnetic medium, which is not yet positively set forth in combination with the head in the claims) [as per claim 10]; wherein the first magnetic reluctance is capable of being approximately ten times the second magnetic reluctance (i.e., again dependent on the

Art Unit: 2652

selection of the magnetic medium, which is not yet positively set forth in combination with the head in the claims) [as per claim 11]; and wherein the main pole piece has a first area at an air-bearing surface of the head and the floating-trailing shield has a second area on the air-bearing surface and the second area is substantially greater than the first area (as shown in FIG. 6, for instance) [as per claim 12]. With respect to the intended use limitation appearing in lines 1-2 of claim 9, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic medium with a magnetically soft underlayer", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, *supra*.

With respect to claims 15-16, Shukh teaches a thin film magnetic recording head (200) comprising a yoke (202) including a main pole piece (204) of ferromagnetic material that extends to an air-bearing surface of the head (as shown in FIG. 5, for instance) and a return pole piece (206) of ferromagnetic material that extends to the air-bearing surface of the head (as shown in FIG. 5, for instance); a floating-trailing shield (234) of ferromagnetic material separated from the yoke by non-magnetic material (236), extending to the air-bearing surface of the head (as shown in FIG. 5, for instance) and positioned on an opposite side of the main pole piece from the return pole piece at the air-bearing surface (as shown in FIG. 5, for instance) [as per claim 15]; wherein a first magnetic reluctance between the main pole piece and the floating-trailing shield is capable of being substantially greater than a second magnetic reluctance between the

Art Unit: 2652

floating-trailing shield and a magnetically soft underlayer of a magnetic medium (i.e., dependent on the selection of the magnetic medium, which is not yet positively set forth in combination with the head in the claims). With respect to the intended use limitation appearing in lines 1-2 of claim 15, note that a recitation with respect to the manner in which a claimed apparatus (i.e., a "thin film magnetic recording head") is intended to be employed (i.e., "for use with a magnetic medium with a magnetically soft underlayer", for instance) does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. See *Ex parte Masham*, supra.

Claim Rejections/Considerations - 35 USC § 103

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Pertinent Prior Art

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. This includes Das (US 5,075,956), Chang et al. (US 6,407,891), Chen et al. (US 6,809,899), and Nguy et al. (US 6,950,277), which each individually teaches a thin film magnetic recording head comprising a yoke including a main pole piece of ferromagnetic material and a return pole piece of ferromagnetic material; and a floating-trailing shield of ferromagnetic material positioned on an opposite side of the

Art Unit: 2652

main pole piece from the return pole piece, the floating-trailing shield being separated from the yoke by non-magnetic material.

Allowable Subject Matter

13. Claims 5, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 2652

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Craig A. Renner
Primary Examiner
Art Unit 2652

CAR